

Spotted Fever Rickettsiosis, including Rocky Mountain Spotted Fever

Agent: Tick-borne species of *Rickettsia* (bacteria). Spotted fever rickettsiosis (SFR) may be caused by several different tick-borne disease agents, including *Rickettsia rickettsii*, the cause of Rocky Mountain spotted fever (RMSF), and *Rickettsia parkeri*, the cause of Tidewater spotted fever. RMSF positive laboratory results may also be caused by exposure to other tick-borne species of *Rickettsia* that commonly occur in Virginia's ticks such as *R. amblyomii* (a non-pathogenic agent carried by more than 55% of lone star ticks), and *R. montanensis* (a non-pathogenic agent carried by 10% of American Dog Ticks).

Mode of Transmission: Transmitted to humans by the bite of an infected tick. Ticks generally must be attached for 10 to 20 hours to transmit the bacterium.

Signs/Symptoms: Persons with spotted fever rickettsiosis may have a sudden onset of fever, severe headache, muscle pain, nausea and vomiting and a rash. In the case of RMSF, a rash may develop three to five days after onset of illness. This rash starts on the wrists and ankles, and spreads to the rest of the body, and is seen in about 90% of RMSF cases.

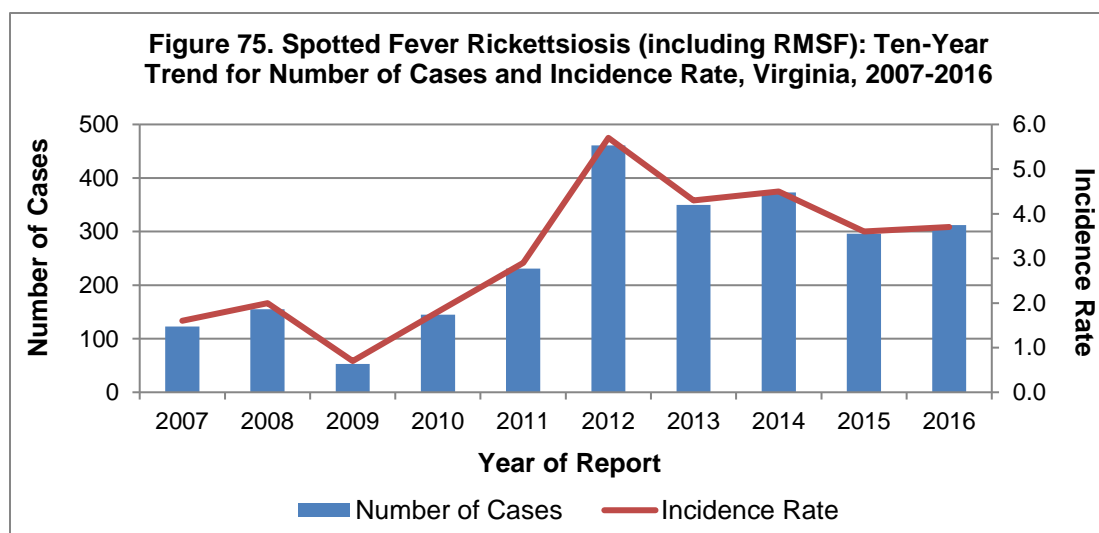
Prevention: RMSF, the most serious SFR, may be transmitted by either the brown dog tick (*Rhipicephalus sanguineus*) or the American dog tick (*Dermacentor variabilis*). Although brown dog ticks are uncommon, they are a much more important RMSF vector than the American dog tick. Bites by brown dog ticks can be avoided by vigilance for ticks when exposed to the bedding, floors or walls of kennels, dog houses or buildings where dogs live. Bites by the American dog tick can be prevented by avoiding tick-prone habitats such as leaf litter or low vegetation in forests, old fields with early succession forest growth, or open fields with tall brush and weeds. When in tick-prone habitats, the most effective tick prevention method is to wear pants, socks and shoes that are treated with a Permethrin clothing treatment. Pants legs should be tucked into socks and shirts tucked into pants. Light-colored clothing should be worn to make ticks more visible. If treated clothing is not worn, repellents containing DEET, Picaridin, BioUD, IR3535, or oil of lemon eucalyptus as active ingredients are effective against ticks and should be applied to exposed areas of skin before entering tick habitats. After visiting tick habitats, a person should thoroughly check all body surfaces for ticks and, if found, attached ticks should be removed with tweezers as soon as possible.

Other Important Information: Although the severity of infections attributable to spotted fever rickettsiosis varies greatly depending on the causative agent, all suspect patients should be treated as if they have RMSF. RMSF can be a serious illness, particularly in untreated patients or patients treated late in the course of illness. About 25% of all untreated RMSF cases are fatal and up to 3% of hospitalized patients die because treatment was provided too late in the course of illness. If tick exposure is noted or RMSF is suspected, treatment should be started based on suspicion of infection and not delayed pending the outcome of diagnostic tests. While SFR case numbers have increased dramatically in recent years, case-fatality rates have declined to less than 1% of reported cases. One possible explanation is prompt disease recognition and increased availability and appropriate use of effective antibiotics. Another explanation is the increasing prevalence of other spotted fever group *Rickettsia* (SFGR) species in Virginia's ticks. These other SFGR species may not cause illness in people, or may cause only a mild illness, but exposure to any SFGR causes cross-reactive positive results on blood tests for RMSF. Therefore, it is possible that most reported RMSF cases in recent years are actually due to exposure to non-pathogenic or mildly pathogenic SFGR, and/or to other Rickettsial illnesses such as ehrlichiosis, which cause acute symptoms similar to those of RMSF. Lone star ticks are the most common cause of tick bites in Virginia, and tick surveys have shown that the majority

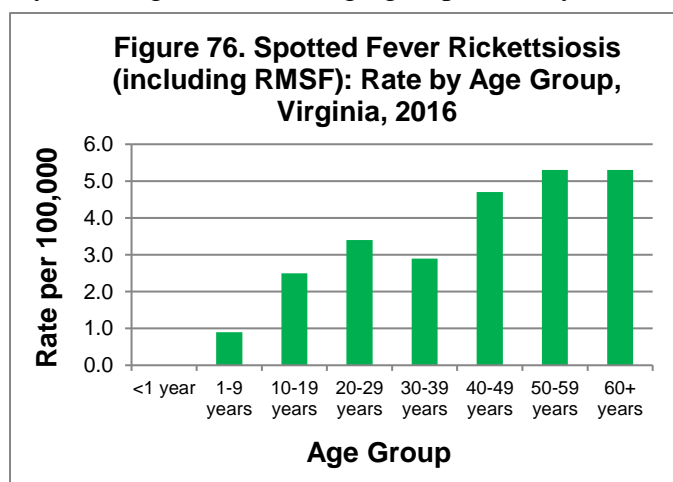
of lone star ticks in Virginia carry a non-pathogenic SFGR, as well as several agents of ehrlichiosis, but do not carry RMSF. No cases of Tidewater Spotted Fever, an emerging illness caused by *Rickettsia parkeri*, were identified in 2016. *Rickettsia parkeri* is a species of *Rickettsia* transmitted to humans by the Gulf Coast tick (*Amblyomma maculatum*) and occasionally by the lone star tick.

Spotted Fever Rickettsiosis: 2016 Data Summary	
Number of Cases:	312
5-Year Average Number of Cases:	342.2
% Change from 5-Year Average:	-9%
Incidence Rate per 100,000:	3.7

In 2016, 312 cases of spotted fever rickettsiosis were reported in Virginia. While this represents a 5% increase from the 296 cases reported in 2015, the 312 cases are a 9% decrease from the five-year average of 342.2 cases per year (Figure 75).



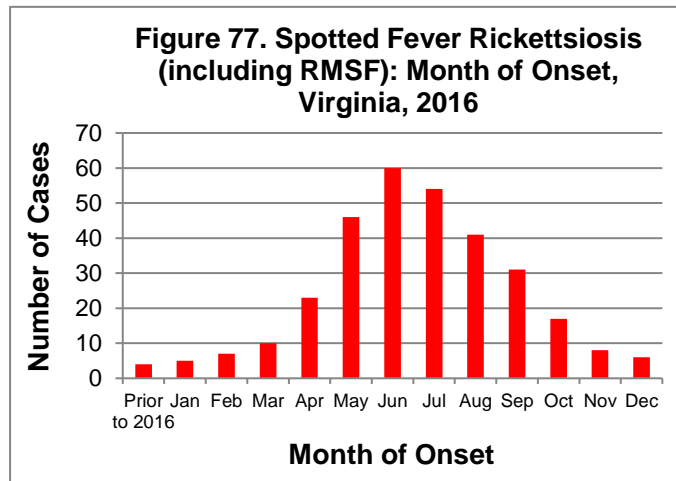
For 2016, in general, the rate of SFR tended to increase with increasing age (Figure 76). No cases were reported in children less than one year of age, while the age groups of 60 years and older and 50-59 years both had an incidence rate of 5.3 per 100,000. The 30-39 year age group was the only group not falling within the rising trend pattern with an incidence rate of 2.9 per 100,000. This general pattern of increasing incidence with increasing age groups has been observed in Virginia since 2004, and is consistent with the age distribution of Rickettsial diseases other than RMSF, such as ehrlichiosis or anaplasmosis.



Race information was not provided for 56% of cases. Among those with a known race, the incidence rate for the white population was highest with 2.0 cases per 100,000. Incidence in the black population was 0.7 cases per 100,000, while the “other” race category had an incidence rate of 0.5 per 100,000. Males had nearly double the incidence rate of females with a rate of 4.9 per 100,000 compared to 2.5 per 100,000 for females.

The southwest region had the highest incidence rate at 7.1 cases per 100,000. The central region had the second highest incident rate with 5.6 per 100,000 followed closely by the northwest region with 5.0 cases per 100,000. Incidence rates in the remaining two regions were 1.9 and 1.4 per 100,000, respectively. The northwest and central regions have had high incidence rates since 2009, but the incidence rate in the southwest region increased substantially during 2012, and has remained the region with the highest incidence rate since 2013. Incidence rates by locality can be viewed in the map below.

Spotted fever rickettsiosis displays a distinctly seasonal pattern. For 80% of cases, symptom onset occurred from May through August, with a peak in June and July (Figure 77). This is consistent with the peak activity periods for the most common human-biting tick species in Virginia.



Spotted Fever Rickettsiosis, including RMSF, Incidence Rate by Locality, Virginia, 2016

